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EXAMINER	
PATEL, KINARI M	

ART UNIT	PAPER NUMBER
2654	8

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/731,084	ARROWOOD ET AL.	
	Examiner	Art Unit	
	Kinari Patel	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 December 2000* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Martino et al (US Patent No. 6,061,646) in view of Slyh et al (US Patent No. 5,574,824).

As per claim 1, Martino et al. discloses an apparatus comprising:

a) a self-service kiosk which dispenses articles, currency, or communication services (Col. 1, Ln. 41-60, FIG. 2). Martino et al. fails to disclose b) within the kiosk, a steerable-beam microphone array which points a microphone lobe toward a position emanating the highest signal-to-noise ratio, for receiving speech from a customer.

One with ordinary skill in the art at the time of invention would readily know a steerable-beam microphone array which points toward a position emanating the highest signal-to-noise ratio as taught by Slyh et al. Slyh et al. discloses a microphone array beamformer with lobes that forms it output whereby the desired signal components add coherently while the interference and noise components generally do not. An array response is accomplished in the desired direction

and prevents the array from canceling the desired signal along with the intereference and noise (Col. 5, Ln. 64-67 and Col. 6, Ln.10-16). Furthermore, the array adjusts its beam pattern in order to trade off less attenuation for some singals in exchange for greater attenuation of other, more powerful signals in an attempt to maximize the output SNR (Col. 6, Ln. 32-36). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Martino et al. wherein within the kiosk, a steerable-beam microphone array which points a microphone lobe toward a position emanating the highest signal-to-noise ratio, for receiving speech from a customer because one with ordinary skill in the art would recognize that this would serve the purpose of strategically placing the microphone for more accurate speech recognition for suppressing background noise and localizing sound sources effectively.

As per claim 2, Martino et al. as modified by Slyh et al. disclose all the limitations of a system according to claim 1. Martino et al. further discloses the system of claim 1 further comprising a speech recognition apparatus for recognizing speech (Col. 2, Ln. 21-29).

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Martino et al (US Patent No. 6,061,646) in view of Slyh et al (US Patent No. 5,574,824) and Nagata (US Patent No. 6,009,396).

As per claim 3, Martino et al. discloses an apparatus comprising:

a) a self-service kiosk which dispenses articles, currency, or communication services (Col. 1, Ln. 41-60, FIG. 2). Martino et al. fails to disclose:

b) within the kiosk,

i) a steerable beam microphone array, having multiple lobes;

ii) means for sampling lobes, and

A) distinguishing the difference between speech content and noise content from sound signals received by each lobe,

B) identifying lobes having a relatively high speech content,

C) identifying lobes having a relatively low noise content, and

D) actuating a lobe having both a relatively high speech content and relatively low noise content.

One with ordinary skill in the art at the time of invention would readily know the aforementioned features, as taught by Slyh et al. Slyh et al. teach a steerable beam microphone array (abstract: it is inherent that that array has lobes when it receives a sound source). Slyh et al. further teach distinguishing the difference between speech content and noise content from sound signals (Col. 5, Ln. 40-41). Furthermore, Nagata further teaches a sound source position search unit that estimates a power arriving from each position (Col. 6, Ln. 1-2 and Ln. 42-47; Col. 9, Ln. 29-35; FIG. 3, 3, FIG. 6). The sound source position search unit is the equivalent of ii) means for sampling lobes, since as described in the specification, a lobe is a plot of magnitude versus angular position.

Moreover, Nagata discloses that all peaks above a threshold are detected as sound sources (Col. 10, Ln. 4-5). This is the equivalent of identifying lobes having a relatively low noise

content. Moreover, Nagata discloses a speech parameter extraction unit extracts the power for each bandwidth and uses it as a speech parameter. This speech parameter is sent to the speech recognition unit (Col. 10, Ln. 24-27, FIG. 3). In the speech recognition unit, the speech power is calculated from the speech parameter (Col. 10, Ln. 32-33). This is equivalent to identifying lobes having a relatively high speech content. Moreover, it is obvious to actuate a lobe having both a relatively high speech content and relatively low noise content since one in the art would obviously like to put the prior signal processing to use in a meaningful way.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Martino et al. to further include within a kiosk a steerable beam microphone array, having multiple lobes; ii) means for sampling lobes, and A) identifying lobes having a relatively high speech content, B) identifying lobes having a relatively low noise content, and C) actuating a lobe having both a relatively high speech content and relatively low noise content because one with ordinary skill in the art would recognize that this would serve the purpose of strategically placing the microphone for more accurate speech recognition for suppressing background noise and localizing sound sources effectively.

As per claim 4, Martino et al. as modified by Slyh et al. and Nagata discloses all the limitations of the apparatus according to claim 3. Martino et al. fails to disclose the apparatus of claim 3 further comprising: c) speech recognition means for recognizing speech contained in the lobe actuated. One of ordinary skill in the art at the time of the invention would readily know speech recognition means for recognizing speech contained in the lobe actuated, as taught by Nagata. Nagata teaches the band-pass power of the sound source obtained sent from the speech

parameter extraction unit to the speech recognition unit and used in the speech recognition processing (Col. 10, Ln. 24-31, FIG. 7). A lobe that has the potential to be actuated would be from the sound source, and it is obvious to recognize speech contained in the lobe actuated. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Martino et al. to further comprise a speech recognition means for recognizing speech contained in the lobe actuated to process only that part of the signal with high speech content and low noise content for greater speech recognition capability.

4. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martino et al (US Patent No. 6,061,646) in view of Nagata (US Patent No. 6,009,396).

As per claim 5, Martino et al discloses a method, comprising the following steps:

a) maintaining a self-service kiosk which dispenses articles, currency, or communication services (Col. 1, Ln. 41-60, FIG. 2).

Martino et al. fails to disclose:

b) maintaining a beam-steerable microphone array at the self-service kiosk;

c) measuring noise content and speech content of several lobes of the array; and

d) selecting a lobe which carries

i) larger speech signals than other lobes and

ii) smaller noise signals than other lobes.

One of ordinary skill in the art at the time of the invention would readily know b) maintaining a beam-steerable microphone array at the self-service kiosk; c) measuring noise

content and speech content of several lobes of the array; and d) selecting a lobe which carries i) larger speech signals than other lobes and ii) smaller noise signals than other lobes, as taught by Nagata. Nagata teaches Nagata teaches a speech recognition system using a microphone array (Col. 1, Ln. 37-44, FIG. 1). Furthermore, Nagata discloses that all peaks on the sound source distribution above a threshold are detected as sound sources (Col. 10, Ln. 4-5). It is obvious to measure noise content of several lobes of the array since Nagata already distinguishes noise from sound in the signal coming from the microphone array. Moreover, Nagata discloses a speech parameter extraction unit extracts the power for each bandwidth and uses it as a speech parameter. This speech parameter is sent to the speech recognition unit (Col. 10, Ln. 24-27, FIG. 3). In the speech recognition unit, the speech power is calculated from the speech parameter (Col. 10, Ln. 32-33). It is obvious to measure speech content of several lobes in the array since Nagata already measure speech content of the signal coming from the microphone array. Moreover, it is obvious to select a lobe which carries larger speech signals than other lobes and smaller noise signals than other lobes since one in the art would obviously put the prior signal processing to use in a meaningful way in order to enhance speech recognition capabilities.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Martino et al. to further comprise maintaining a beam-steerable microphone array at the self-service kiosk, measuring noise content and speech content of several lobes of the array, and selecting a lobe which carries larger speech signals than other lobes and smaller noise signals than other lobes because one of ordinary skill in the art would recognize that this would provide more accurate speech recognition for suppressing background noise and localizing sound sources effectively.

As per claim 6, Martino et al. as modified by Nagata disclose all the limitations of a method according to claim 5. Martino et al. fails to disclose the method of claim 5 further comprising the step of: e) receiving signals from the lobe selected, and performing speech recognition on the data. One of ordinary skill in the art at the time of the invention would readily know to receive signals from the lobe selected, and perform speech recognition on the data. Nagata discloses a speech recognition unit whereby speech power is calculated from the speech parameter extracted by the speech parameter extraction unit, and a speech section detected by a speech detection unit according to the speech power. Then a pattern matching unit carries out pattern matching with a recognition dictionary so that speech recognition is realized (Col. 10, Ln. 32-39). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Martino et al. to further comprise the step of receiving signals from the lobe selected, and performing speech recognition on the data because one of ordinary skill in the art would readily recognize that this would allow speech recognition on a select part of the signal where speech is most likely carried, as opposed to noise.

Response to Arguments

5. Applicant's arguments with respect to claims 1-4 have been considered but are moot in view of the new ground(s) of rejection.

Regarding claims 1 and 2, Applicant states, "Claim 1 recites a steerable-beam microphone array which points to a microphone lobe toward "a position emanating the highest signal-to-noise ratio. This amendment more clearly distinguishes Applicant's invention from the system as described in Van Schyndel." However, the new limitation is taught by new reference Slyh et al. (US 5,574,824). Slyh et al. discloses a microphone array beamformer with lobes that forms it output whereby the desired signal components add coherently while the interference and noise components generally do not. An array response is accomplished in the desired direction and prevents the array from canceling the desired signal along with the intereference and noise (Col. 5, Ln. 64-67 and Col. 6, Ln.10-16). Furthermore, the array adjusts its beam pattern in order to trade off less attenuation for some singals in exchange for greater attenuation of other, more powerful signals in an attempt to maximize the output SNR (Col. 6, Ln. 32-36). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Martino et al. wherein within the kiosk, a steerable-beam microphone array which points a microphone lobe toward a position emanating the highest signal-to-noise ratio, for receiving speech from a customer because one with ordinary skill in the art would recognize that this would serve the purpose of strategically placing the microphone for more accurate speech recognition for suppressing background noise and localizing sound sources effectively.

Regarding claims 3 and 4, Applicant states, "Peaks above threshold may be detected as the sound sources" as taught by Nagata is not equivalent to "identifying lobes having a relatively low noise content." Furthermore, Applicant has added new limitation "distinguishing the

difference between speech content and noise content from sound signals received by each lobe." New reference Slyh et al. (US 5,574,824) teaches these limitations.

Slyh et al. teach a steerable beam microphone array (abstract: it is inherent that that array has lobes when it receives a sound source). Slyh et al. further teach distinguishing the difference between speech content and noise content from sound signals (Col. 5, Ln. 40-41). Furthermore, Nagata further teaches a sound source position search unit that estimates a power arriving from each position (Col. 6, Ln. 1-2 and Ln. 42-47; Col. 9, Ln. 29-35; FIG. 3, 3, FIG. 6). The sound source position search unit is the equivalent of ii) means for sampling lobes, since as described in the specification, a lobe is a plot of magnitude versus angular position.

Moreover, Nagata discloses that all peaks above a threshold are detected as sound sources (Col. 10, Ln. 4-5). This is the equivalent of identifying lobes having a relatively low noise content. Moreover, Nagata discloses a speech parameter extraction unit extracts the power for each bandwidth and uses it as a speech parameter. This speech parameter is sent to the speech recognition unit (Col. 10, Ln. 24-27, FIG. 3). In the speech recognition unit, the speech power is calculated from the speech parameter (Col. 10, Ln. 32-33). This is equivalent to identifying lobes having a relatively high speech content. Moreover, it is obvious to actuate a lobe having both a relatively high speech content and relatively low noise content since one in the art would obviously like to put the prior signal processing to use in a meaningful way.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Martino et al. to further include within a kiosk a steerable beam microphone array, having multiple lobes; ii) means for sampling lobes, and A) identifying lobes having a relatively high speech content, B) identifying lobes having a relatively

low noise content, and C) actuating a lobe having both a relatively high speech content and relatively low noise content because one with ordinary skill in the art would recognize that this would serve the purpose of strategically placing the microphone for more accurate speech recognition for suppressing background noise and localizing sound sources effectively.

6. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

7. Applicant's arguments filed with respect to claims 5 and 6 have been fully considered but they are not persuasive.

Regarding claims 5 and 6, Applicant states, "Peaks above threshold may be detected as the sound sources" as taught by Nagata is not equivalent to "identifying lobes having a relatively low noise content. The reference does not teach identifying loves having a relatively low noise content." However, Examiner disagrees. Nagata discloses that all peaks on the sound source distribution above a threshold are detected as sound sources (Col. 10, Ln. 4-5). It is obvious to measure noise content of several lobes of the array since Nagata already distinguishes noise from

sound in the signal coming from the microphone array. Moreover, Nagata discloses a speech parameter extraction unit extracts the power for each bandwidth and uses it as a speech parameter. This speech parameter is sent to the speech recognition unit (Col. 10, Ln. 24-27, FIG. 3). In the speech recognition unit, the speech power is calculated from the speech parameter (Col. 10, Ln. 32-33). It is obvious to measure speech content of several lobes in the array since Nagata already measure speech content of the signal coming from the microphone array. Moreover, it is obvious to select a lobe which carries larger speech signals than other lobes and smaller noise signals than other lobes since one in the art would obviously put the prior signal processing to use in a meaningful way in order to enhance speech recognition capabilities.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Martino et al. to further comprise maintaining a beam-steerable microphone array at the self-service kiosk, measuring noise content and speech content of several lobes of the array, and selecting a lobe which carries larger speech signals than other lobes and smaller noise signals than other lobes because one of ordinary skill in the art would recognize that this would provide more accurate speech recognition for suppressing background noise and localizing sound sources effectively.

8. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5

USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kinari Patel whose telephone number is 703-305-8487. The examiner can normally be reached on 9 AM - 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on 703-305-9645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

kp

RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER